



PATENT  
Customer No. 22,852  
Attorney Docket No. 04173.0348

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

Hideaki FUKUZUAWA et al.

Application No.: 08/940,020

Filed: September 29, 1997

For: MAGNETORESISTANCE EFFECT  
DEVICE HAVING HARD  
MAGNETIC FILM STRUCTURAL  
BODY (as amended)

Group Art Unit: 2652

Examiner: D. Davis

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Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT  
UNDER 37 C.F.R. § 1.97(d)**

Pursuant to 37 C.F.R. §§ 1.56 and 1.97(d), and supplemental to the Information Disclosure Statement filed on April 7, 1999, Applicants bring to the attention of the Examiner the documents listed on the attached PTO 1449. This Information Disclosure Statement is being filed after a Final Action and is accompanied by a fee of \$180.00 as specified under § 1.17(p) and a certification as specified under § 1.97(e). Applicants respectfully request that the Examiner consider the listed documents and indicate that they were considered by making appropriate notations on the attached form.

The documents listed on the attached form PTO 1449 include three references cited in an Office Action issued by the Japanese Patent Office in a counterpart foreign

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application. A copy of that Office Action is also attached herewith. This Information Disclosure Statement is being filed within three months of the September 2, 2003 mailing date of that Office Action.

Abstracts of the non-English documents cited in that Office Action are enclosed.

In lieu of an English translation of the Office Action issued by the Japanese Patent Office, Applicants submit the following statement of relevance of the non-English language documents cited in that Office Action.

1. Japanese Published Patent Application No. Hei 04-153910

This reference discloses a magnetic recording medium comprising a non-magnetic support 1, a first undercoat layer 2 formed on the nonmagnetic support and consisting of amorphous or fine crystalline material (at least one metal selected from Ti, Zr, Hf, V, Nb, Ta, Cr, Mo and W and Y: claim 2), a second undercoat layer 3 consisting of metal (such as Cr) and formed on the first undercoat layer, a magnetic layer 4 (such as Co-Ni-type) formed on the second undercoat layer, a protective layer 5 (such as carbon) formed on the magnetic layer.

However, this reference is silent about a hard magnetic film having a bi-crystal structure of the present invention.

In the present invention, a hard magnetic film which constitutes a hard magnetic film structural body comprises a bi-crystal structure, as claimed in claims 1 and 12, and as shown in Fig. 3. Incidentally, the magnetic recording medium of the present invention enables to achieve high density recording with a lower noise due to that the hard magnetic layer as a recording layer has a bio-crystal structure.

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2. Japanese Published Patent Application No. Hei 10-074314

This reference discloses a magnetic recording medium and a magnetic storage device, the magnetic storage device comprising a magnetic recording medium, a driving part thereof, a magnetic head comprising a magnetic recording part and a magnetic reproducing part, relatively moving means the magnetic head with respect to the magnetic recording medium, and processing means for recording input signal from the magnetic head and reproducing output signal from the magnetic head. The reproducing part of the magnetic head is constituted of a magnetoresistance effect type magnetic head, and the magnetic recording medium is constituted of a substrate 20, a plurality of laminated undercoat layers 21, 22, 23 and a magnetic layer 24, wherein at least one layer of the undercoat layers consists of amorphous or fine crystalline layer containing Co.

However, this reference does not refer to a hard magnetic layer having a bi-crystal structure.

3. Japanese Published Patent Application No. Hei 09-293236

This reference relates to a PERM (pre embossed rigid magnetic) for use in a magnetoresistance effect type head as a reproducing head. This reference discloses a magnetic disk comprising a metal-magnetic thin film 2 (Co-Pt, Co-Pd alloy: claim 2) formed on a non-magnetic substrate 1 having at least servo signal formed in a pattern of projection and depression (Figs. 2, 3), wherein a thickness of the metal-magnetic thin film is 50 nm or less. (Claim 1) Further this reference discloses an undercoat layer having a first undercoat layer 4 (claim 9, C, Si, or Ge) and a second undercoat layer 3 (claim 9, Cr) formed on the nonmagnetic substrate 1 (Fig. 5).

Accordingly, this reference does not teach or suggest a hard magnetic film structure body claimed in claim 1 or 12 of the present invention.

This submission does not represent that a search has been made or that no better art exists and does not constitute an admission that each or all of the listed documents are material or constitute "prior art." If the Examiner applies any of the documents as prior art against any claims in the application and Applicants determine that the cited documents do not constitute "prior art" under United States law, Applicants reserve the right to present to the office the relevant facts and law regarding the appropriate status of such documents.



Applicants further reserve the right to take appropriate action to establish the patentability of the disclosed invention over the listed documents, should one or more of the documents be applied against the claims of the present application.

If there is any fee due in connection with the filing of this Statement, please charge the fee to our Deposit Account No. 06-0916.

Respectfully submitted,

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Dated: November 4, 2003

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